

in a dielectric layer, wherein the nucleation layer includes substantially uniform grains. Sandhu fails to disclose such an element.

In contrast to that currently claimed by independent Claim 25, Sandhu is directed to an aluminum film for semiconductive devices. (Title). Sandhu teaches that a conductive stack may be formed in an opening 52 in a passivation layer 22. Sandhu discloses that the conductive stack comprises a first titanium nitride layer 30, a second aluminum film layer 38, a third passivation layer 40 and a fourth aluminum film layer 42.

The Examiner asserts that the second aluminum film layer 38 taught by Sandhu is similar to the nucleation layer claimed in independent Claim 25. The Applicants respectfully disagree. First, Sandhu fails to teach that its second aluminum film layer 38 has substantially uniform grains, as required by independent Claim 25 of the present invention. It is well known that a standard aluminum layer is quite dissimilar to a nucleation layer having a substantially uniform grain size. For example, those skilled in the art understand that particular processing conditions need to be used in the formation of the underlying barrier layer (e.g., Sandhu's first titanium nitride layer 30) to achieve the nucleation layer having a uniform grain size. Sandhu fails to teach much of any processing conditions, and especially fails to teach the conditions required to achieve the nucleation layer having a uniform grain size. Accordingly, wherein the individual grains of the nucleation layer are substantially uniform in size, the individual grains of Sandhu's standard aluminum film vary in size. Thus, Sandhu fails to teach the element that the nucleation layer have substantially uniform grains.

Therefore, Sandhu does not disclose each and every element of the claimed invention and

as such, is not an anticipating reference. Because Claims 28, 32 and 33 are dependent upon Claim 25, Sandhu also cannot be an anticipating reference for Claims 28, 32 and 33. Accordingly, the Applicants respectfully request the Examiner to withdraw the §102 rejection with respect to these Claims.

II. Rejection of Claims 26, 27, 29, 30 and 31 under 35 U.S.C. §103

The Examiner has rejected Claims 26, 27, 29, 30 and 31 under 35 U.S.C. §103(a) as being unpatentable over Sandhu as applied to claim 25 above, and further in view of Wolf, Silicon Processing for the VLSI Era: Vol 2-Process Integration, 1990, pages 132, 189-192 (Wolf). The Applicants established above that Sandhu fails to teach the element that a nucleation layer having a substantially uniform grain size be located over a barrier layer and within an opening in a dielectric layer.

Sandhu also fails to suggest such an element. Sandhu fails to suggest such an element because Sandhu is only concerned with alternating standard aluminum layers with passivation layers to fill an opening 52. Sandhu is not concerned, however, with forming a nucleation layer having a substantially uniform grain size, as required by independent Claim 25 of the present invention. This is particularly obvious in view of Sandhu's failure to teach a single processing condition which might result in the nucleation layer required by the present invention. In fact, one skilled in the art would not be motivated to replace the standard aluminum film of Sandhu with the nucleation layer having a substantially uniform grain size without using the present invention as a blueprint. Thus, Sandhu also fails to teach or suggest such an element.

Similarly, Wolf fails to teach or suggest the missing element. The Examiner is using Wolf for the sole proposition that aluminum and tungsten are interchangeable as conductive plug materials. Notwithstanding the merits of the Examiner's position, Wolf also fails to teach or suggest the element that a nucleation layer having a substantially uniform grain size. A teaching or suggestion of interchanging aluminum and tungsten is dissimilar to a teaching that a nucleation layer having a substantially uniform grain size, as required by independent Claim 25.

Accordingly, Sandhu individually or in combination with Wolf, fails to teach or suggest each and every element of independent Claim 25 and as such, it fails to establish a *prima facie* case of obviousness with respect to independent Claim 25, and any claim dependent therefrom.

In view of the foregoing remarks, the cited references do not support the Examiner's rejection of Claims 26, 27, 29, 30 and 31 under 35 U.S.C. §103(a). The Applicants therefore respectfully request the Examiner withdraw the rejection.

III. Conclusion

In view of the foregoing amendment and remarks, the Applicants now see all of the Claims currently pending in this application to be in condition for allowance and therefore earnestly solicit a Notice of Allowance for Claims 25-33.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version with markings to show changes made."

The Applicants request the Examiner to telephone the undersigned attorney of record at (972) 480-8800 if such would further or expedite the prosecution of the present application.

Respectfully submitted,

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